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On the distribution of *Ahaetulla laudankia* Deepak, Narayanan, Sarkar, Dutta & Mohapatra, 2019 and *Lycodon travancoricus* (Beddome, 1870) (Squamata, Colubridae) from Gujarat, India

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Abstract

We report the first record of a snake, *Ahaetulla laudankia* Deepak, Narayanan, Sarkar, Dutta & Mohapatra, 2019 (Colubridae, Ahaetullinae) and confirm the occurrence of *Lycodon travancoricus* (Beddome, 1870) (Colubridae, Colubrinae) from Gujarat state based on reptile surveys conducted in South, Central, and Saurashtra regions of the state. We also provide new information on the morphology, microhabitat, diet, and behaviour of these species.

Keywords

Endemic species, morphology, scale-reduction, taxonomy.

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Introduction

In the recent checklist of the reptiles of the Indian state of Gujarat, Patel and Vyas (2019) listed 107 species, including 54 species of snake. They reported an additional 13 snake species which were mentioned in the literature but whose occurrence in Gujarat state needed verification, pending reliable, correctly identified vouchers. In this paper, we report new state record for one species of snake and confirm the presence of another species in Gujarat. These records are the results of our ongoing study to document the reptilian fauna of the state.

Ahaetulla laudankia Deepak, Narayanan, Sarkar, Dutta & Mohapatra, 2019 was recently described based on the type series (holotype and two paratypes) and two referred specimens collected from Odisha and Rajasthan states, India (Deepak et al. 2019). It is an Indian endemic species and can be morphologically distinguished from similar appearing Indian congeners by its higher ventral counts, dorsal scale reduction formula, and colouration. The other species, *Lycodon travancoricus* (Beddome, 1870) is also endemic to India, having been reported from the Western Ghats, parts of the Eastern Ghats, and central India with confirmed reports from Andhra Pradesh, Goa, Kerala, Karnataka, Madhya Pradesh, Maharashtra, Odisha, and Tamil Nadu states (Smith 1943; Whitaker and Captain 2004). This species can be morphologically separated from other Indian congeners by its undivided

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anal scale and loreal scale not in contact with the internasals (Smith 1943; Whitaker and Captain 2004). Sharma and Jani (2015) reported *L. travancoricus* from Vansda National Park, Navsari, Gujarat based on two *in situ* photographs without any morphometric or scalation data; hence, the occurrence of this species in the state has been questioned (Patel et al. 2018; Patel and Vyas 2019). Our recent herpetological surveys throughout the state and careful review of previously collected data have confirmed the presence of both species in Gujarat.

Methods

The present study is based on three live specimens (two specimens of *Ahaetulla laudankia*, RV 01 and RV 02; one specimen of *Lycodon travancoricus*, HP 01) rescued by snake rescuers or found by naturalists and brought to us. The individuals were photographed, examined, and released at the same locality within a few days. The specimens of both species were kept in captivity to collect some basic information on their feeding behavior, as little or no information is known about their natural history and behavior. The study also includes two specimens collected by us during our ongoing survey to document the herpetofauna of Gujarat. Our surveys were undertaken with appropriate permissions, which were granted by the Gujarat Forest Department (permit no. WZP/5585/22/C/590-92/3-8-1990, B/WPS/8/9388-92/2013-14, and WPS/T4/682/B/2931/2016-17) and in accordance with the Indian Wildlife (Protection) Act 1972. The datum used for geographic coordinates is WGS84. The specimens were euthanized with halothane, fixed in 4% formaldehyde, and later transferred to 70% ethanol and deposited in the collections of the Bombay Natural History Society, Mumbai (BNHS). The pholidosis and morphometric data of all the specimens are given in Table 1.

Ventral scales were counted following Dowling (1951a). Measurements of voucher specimens were taken with digital callipers to the nearest 0.1 mm or, for length, with a string and ruler to nearest mm. Descriptions and mensural characters were compared with available literature (Smith 1943; Deepak et al. 2019). The number of dorsal scale rows were counted at approximately one head length behind the head, midbody, and one head length before vent respectively. Dorsal scale reduction formula follows Dowling (1951b), with modification proposed by Mohapatra et al. (2017). Subcaudal counts reported here do not include the terminal scute. The number of supralabials in contact with the eyes is given in brackets next to the number of supralabials. Values for symmetric head characters are given in right to left order. Description style follows Patel et al. (2015) with some modifications. Scalation and other comparable characters are described as ventral scales (V); subcaudal scales (SC); dorsal rows of scales (D); supralabial scales (SL); loreal scales (L); preocular scales (PreO); postocular scales (PostO,); presubocular scales (PsubO); temporal scales (T); infralabial scales (IL); snout-vent length (SVL); tail length (TaL); total length (TL); head length (HL); head width (HW).

Results

Family Colubridae

Subfamily Ahaetullinae

***Ahaetulla laudankia* Deepak, Narayanan, Sarkar, Dutta & Mohapatra, 2019**
Laudankia Vine Snake (Fig. 1)

New records. India: Gujarat • Junagadh district, Junagadh city, near Bhavnath (21.5365°N, 070.5003°E; 155 m elevation), 2 February 2018, Raju Vyas and Pranav Vaghashiya leg. (1 specimen, unsexed, BNHS 3532; Fig. 1A, B) • Chhota Udaipur district, near Sukhi Dam

Table 1. Scale counts and measurements (mm) of snake specimens (ND = not determined).

	Ahaetulla laudankia			*Lycodon travancoricus*	
	BNHS 3532	**RV 01**	**RV 02**	**BNHS 3533**	**HP 01**
Locality	Junagadh, Gujarat	Sukhi Dam, Chhota Udaipur	Ataladra, Vadodara	Waghai, Dang, Gujarat	Don, Dang, Gujarat
TL	530	490	1315	460	347
SVL	360	320	850	370	290
TaL	170	170	465	90	57
D	15:15:13	13:15:11	15:15:13	17:17:15	17:17:15
V	191	197	194	183	192
A	Divided	Divided	Divided	Undivided	Undivided
SC	161	180	153	67	79
SL	9(6)/8(5)	8(5)/9(6)	8(5)/8(5)	9(3-5)/9(3-5)	9(3-5)/9(3-5)
L	—	—	—	1/1	1/1
IL	9/9	9/9	9/9	11/11	10/10
PreO	1/1	1/1	1/1	1/1	1/1
PsubO	2/2	2/2	2/2	—	—
PostO	2/2	2/2	2/3	2/2	2/2
T	2+2+2/2+2+2	1+2/1+2	2+2+2/2+2+2	2+4/2+4	2+3/2+3
Sex	ND	Male	Female	Male	ND

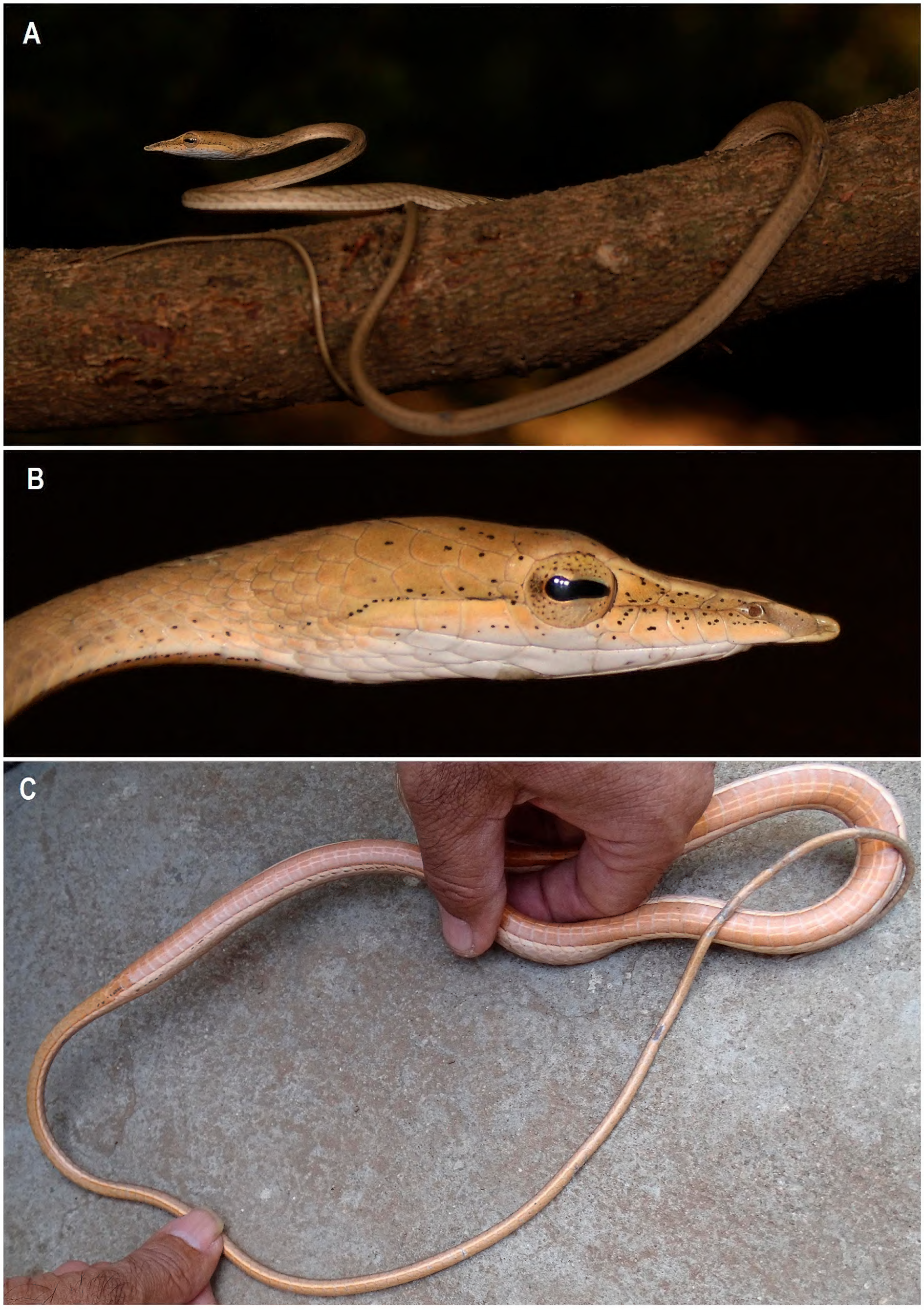

Figure 1. *Ahaetulla laudankia* from Gujarat, India. **A.** dorso-lateral aspect of BNHS 3532. **B.** head lateral of BNHS 3532. **C.** ventral aspect of RV 02 (all images in life).

(22.4530°N, 073.8442°E; 186 m elevation), 25 November 2011 (1 uncollected specimen, male, RV 01) • Vadodara district, Vadodara city, Ataladra (22.2696°N, 073.1425°E; 32 m elevation); 21 March 2018 (1 uncollected specimen, female, RV 02; Fig. 1C).

Identification. Morphology and coloration: head elongate, comprising 3.55% of total length, triangular anterior to eye, ends with an elongated dermal appendage; longer than wide (HL/HW = 3.20); distinct from neck; eyes oval with horizontally elliptical pupil; nostrils small; body subtriangular. Dorsal ground colour of live individual ochre-brown speckled with black dots; supralabials pale orange; infralabials white; underside pale ochre, a pair of whitish lines on mid venter from neck up to the cloaca.

Lepidosis: Dorsal scale rows (DSR) smooth, 15:15:13 rows in BNHS 3532 and RV 02 and 13:15:11 rows (15:15:13 or 15:15:11 rows; fide Deepak et al. 2019) in RV 01. Ventrals 191–197 (192–202; fide Deepak et al. 2019); anal divided; subcaudals 153–180 (154–185; fide Deepak et al. 2019), divided; canthus rostral prominent; nasal lanceolate, visible from above; 2 internasals, twice as long as wide; 2 prefrontals, longer than wide, as long as internasals; frontal rhomboidal, longer than wide; parietals longer than wide, as long as frontal; 1 preocular reaching top of head; 2 presuboculars; 2 postoculars; temporal scales in 1 + 2 + 2 or 2 + 2 + 2 (1 + 2 + 2; fide Deepak et al. 2019); 8–9 (8; fide Deepak et al. 2019) supralabials, 5th or 6th touch the eye; 10–11 infralabials. Dorsal scale reduction from 15 to 13 rows occurs between ventrals 142–143 in BNHS 3532, scale reduction formula is as:

$$15(10)\frac{2+3(143)}{3+4(142)}13(181)$$

Distribution. The new records show that *A. laudankia* occurs in Chhota Udaipur and Vadodara districts of the Central Gujarat region and Junagadh distict of the Saurashtra region (Fig. 2).

Habit, habitat, and natural history. All individuals were found during daytime and on handling showed aggression by opening of the mouth widely. The specimen numbered BNHS 3532 was found crossing a road in a dry deciduous forest, RV 01 was found in a dry deciduous forest area, and RV 02 was rescued from an urban area. Live individuals were held captive for a few days; juveniles of *Eutropis macularia* (Blyth, 1853) and *Sitana spinaecephalus* Deepak, Vyas & Giri, 2016 were offered as food and accepted.

Subfamily Colubrinae

***Lycodon travancoricus* (Beddome, 1870)**
Travancore Wolf Snake (Fig. 3)

New records. India: Gujarat • Dang district, Waghai, near Waghai-Ahwa road (20.7877°N, 073.5115°E; 166 m elevation), 14 October 2018, Harshil Patel leg. (1 specimen, male, BNHS 3533; Fig. 3A, B) • Gujarat, Dang district, near Don hill (20.7311°N, 073.8596°E; 890 m elevation),

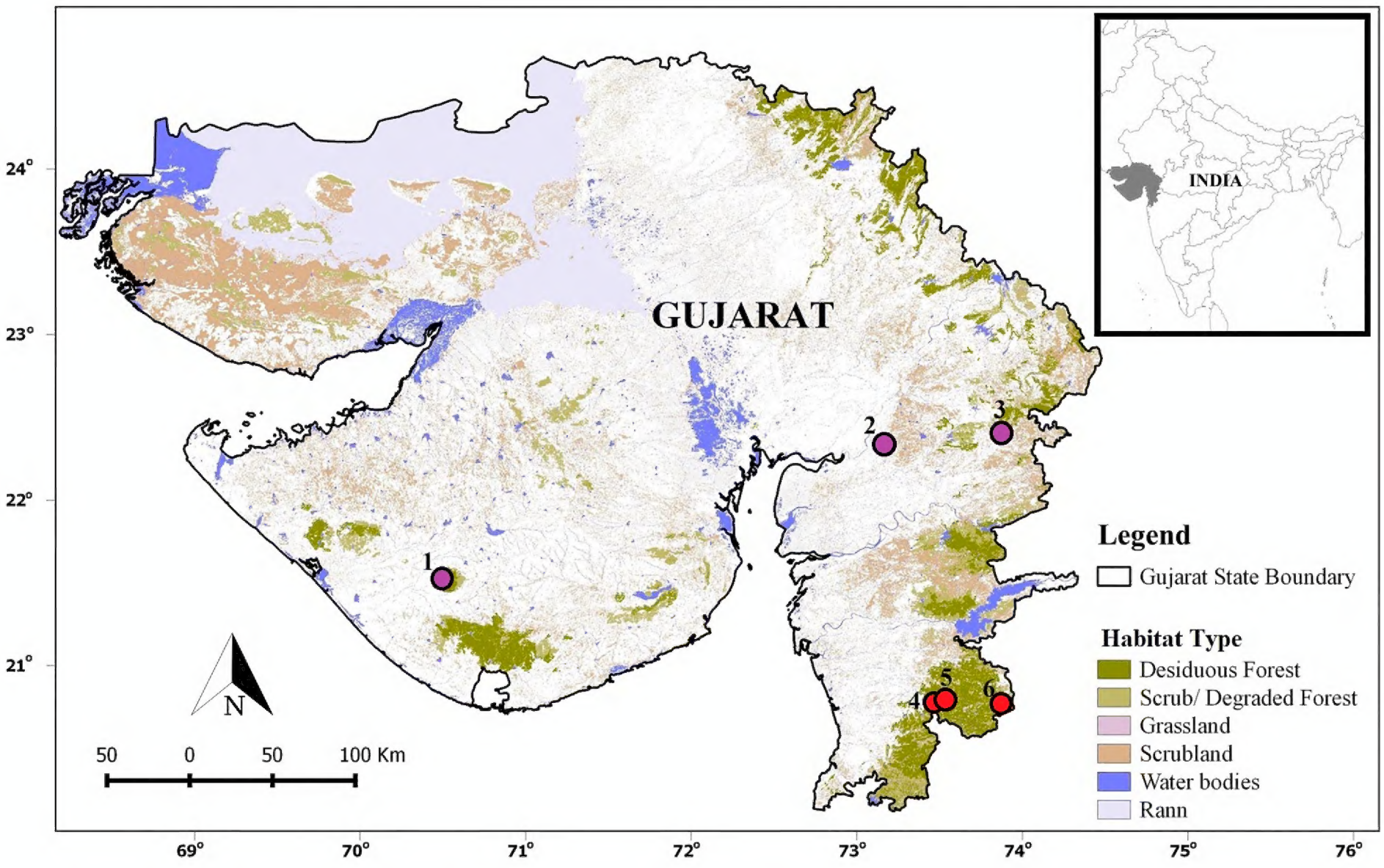

Figure 2. Map of Gujarat showing locations from where *Ahaetulla laudankia* (black circle, purple fill) and *Lycodon travancoricus* (black circle, red fill) were reported in Gujarat: (1) Bhavnath, Junagadh district; (2) Ataladra, Vadodara district; (3) Sukhi Dam, Chhota Udaipur district; (4) Vansda National Park, Navsari district; (5) Waghai, Dang district; (6) Don hill, Dang district.

Figure 3. *Lycodon travancoricus* from Gujarat, India. **A.** dorso-lateral aspect of BNHS 3533 in life. **B.** head lateral of BNHS 3533 in preservation.

30 June 2016 (1 uncollected specimen, unsexed, HP 01).

Identification. Morphology and coloration: head short, comprising 2.85% of total length; longer than wide (HL/HW ratio 1.65); distinct from neck; eyes circular with round pupil; nostrils large; body circular. Dorsal ground colour of live individuals was dark purplish-brown with 41–43 dull yellow bands speckled with black, bands on tail indistinguishable; supralabials pale brown; underside cream white.

Lepidosis: DSR smooth, glossy, in 17:17:15 rows; with single apical pit on the posterior margin. Ventrals 183–192; anal undivided; subcaudals 67–79 (64–76; fide Smith 1943), divided; rostral wider than high, not visible from above; 2 internasals, as long as wide; 2 prefrontals, longer than wide, twice as long as the internasals; frontal triangular, slightly longer than wide; parietals longer than wide, slightly longer than frontal; 1 loreal, twice longer than high, touching 2nd and 3rd supralabials; 1 preocular reaching top of head; 2 postoculars; 2 anterior temporal scales; 3–4 (3; fide Smith 1943) posterior temporal scales; 9 supralabials, 3rd to 5th touch the eye; 10–11 infralabials.

Distribution. The new records, and that published by Sharma and Jani (2015), show that this species is narrowly distributed in Navsari and Dang, two districts of South Gujarat(Fig. 2).

Habit, habitat, and natural history. Both individuals were found during night and showed aggression and biting behaviour on handling. The individual HP 01 was found on a roadside and BNHS 3533 was found on a trunk of *Madhuca longifolia* var. cf. *latifolia* (Roxburgh), both in moist deciduous forest. Live individuals were held captive for a few days; juveniles of *Hemidactylus* sp. were offered as food and readily accepted.

Discussion

With these new records of two species of snake, the total number of snake species in Gujarat is now 56, and the total reptilian diversity is 109 species. Occurrence of both *Ahaetulla laudankia* and *Lycodon travancoricus* in Gujarat is not unexpected, given that *A. laudankia* is known from the neighbouring state of Rajasthan and *L. travancoricus* is distributed across the Western Ghats, parts of the Eastern Ghats, and central India.

Gujarat is very rich in terms of habitat diversity and four of the 10 biogeographic zones in India are represented in Gujarat, a state which supports a unique and diverse fauna (Rodgers et al. 2002; Vyas 2007). The reptilian fauna of Gujarat is considered to be poorly documented (Vyas 2007; Patel el al. 2018; Patel and Vyas 2019); however, new records, new species discoveries, and taxonomic revisions in recent years has greatly contributed in the understanding of reptilian diversity of the state (Vyas and Desai 2010; Vyas et al. 2011, 2017; Vyas and Prajapati 2012; Vyas and Patel 2013; Patel et al. 2015, 2016; Sharma and Jani 2015; Mirza et al. 2016, 2018; Vyas

2017; Mirza and Patel 2018; Joshi et al. 2017; Agarwal et al. 2018). Our study shows that the reptiles of Gujarat are still far from completely known, and extensive surveys and associated taxonomic studies are needed for the proper documentation of reptiles in the state.

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Authors' Contributions

All authors conducted the field work; HP and RV collected and compiled the data; HP wrote the paper; RV and PV assisted in writing the paper and approved the final draft.

References

Agarwal I, Khandekar A, Ramakrishnan U, Vyas R, Giri VB (2018) Two new species of the *Ophisops microlepis* (Squamata: Lacertidae) complex from northwestern India with a key to Indian *Ophisops*. Journal of Natural History 52: 819–847. https://doi.org/10.1080/00222933.2018.1436203

Deepak V, Narayanan S, Sarkar V, Dutta SK, Mohapatra PP (2019) A new species of *Ahaetulla* Link, 1807 (Serpentes: Colubridae: Ahaetullinae) from India. Journal of Natural History 53 (9–10): 497–516. https://doi.org/10.1080/00222933.2019.1589591

Dowling HG (1951a) A proposed standard system of counting ventrals in snakes. British Journal of Herpetology 1 (5): 97–99.

Dowling HG (1951b) A proposed method of expressing scale reductions in snakes. Copeia 1951 (2): 131–134. https://doi.org/10.2307/1437542

Joshi P, Misher C, Thorat O (2017) New record of agamid lizard *Trapelus agilis* (Olivier, 1804) (Squamata: Agamidae) from Gujarat, India. Russian Journal of Herpetology 24: 78–80.

Mirza ZA, Gowande GG, Patil R, Ambekar M, Patel H (2018) First appearance deceives many: disentangling the *Hemidactylus triedrus* species complex using an integrated approach. PeerJ 6: e5341. https://doi.org/10.7717/peerj.5341

Mirza, ZA, Patel H (2018) Back from the dead! Resurrection and revalidation of the Indian endemic snake genus *Wallophis* Werner, 1929 (Squamata: Colubridae) insights from molecular data. Mitochondrial DNA, Part A 28: 331–334. https://doi.org/10.1080/24701394.2016.1278536

Mirza ZA, Vyas R, Patel H, Maheta J, Sanap RV (2016) A new Miocene-divergent lineage of Old World racer snake from India. PLoS ONE 11: e0148380. https://doi.org/10.1371/journal.pone.0148380

Mohapatra PP, Dutta SK, Kar NB, Das A, Murthy BHCK, Deepak V (2017) *Ahaetulla nasuta anomala* (Annandale, 1906) (Squamata: Colubridae), resurrected as a valid species with marked sexual dichromatism. Zootaxa 4263: 318–332. https://doi.org/10.11646/zootaxa.4263.2.6

Patel H, Naik V, Tank, SK (2016) The Common House Gecko, *Hemidactylus frenatus* Schlegel in Dumeril & Bibron 1836 (Reptilia: Gekkonidae) in Gujarat, India. IRCF Reptiles & Amphibians 23: 178–182.

Patel H, Vyas R, Tank, SK (2015) On the distribution, taxonomy and natural history of the Indian Smooth Snake, *Coronella brachyura* (Günther, 1866). Amphibian & Reptile Conservation 9 (2): 120–125.

Patel H, Vyas R (2019) Reptiles of Gujarat, India: updated checklist, distribution, and conservation status. Herpetology Notes 12: 765–777.

Patel H, Vyas R, Naik V, Dudhatra B, Tank SK (2018) Herpetofauna of the northern Western Ghats of Gujarat, India. Zoology & Ecology 23: 213–223. https://doi.org/10.1080/21658005.2018.1499237

Rodgers WA, Panwar HS, Mathur VB (2002) Wildlife Protected Area Network. In: India: a review (executive summary). Wildlife Institute of India, Dehradun, 44 pp.

Sharma V, Jani M (2015) Natural history notes. *Lycodon travancoricus*. Distribution. Herpetological Review 46: 574.

Smith MA (1943) The fauna of British India, Ceylon and Burma, including the whole of the Indo-Chinese sub-region. Reptilia and Amphibia. Vol. III—Serpentes. Taylor and Francis, London, 583 pp.

Vyas R, Patel H (2013) Notes on distribution and natural history of *Psammophis longifrons* Boulenger 1896 (Serpentes: Psammophiidae: Psammophiinae) in Gujarat, India. Russian Journal of Herpetology 20 (3): 217–222.

Vyas R (2007) Present conservation scenario of reptile fauna in Gujarat state, India. The Indian Forester 133 (10): 1381–1394.

Vyas R (2017) A Northern River Terrapin (*Batagur baska*) from Kutch, with comments on the species distribution in western India and Pakistan. IRCF Reptiles & Amphibians 24: 128–131.

Vyas R, Desai SR (2010) The record of Beddome's Cat Snake *Boiga beddomei* from Purna Wildlife Sanctuary, Gujarat state, India. Reptile Rap 10: 10–13.

Vyas R, Patel H, Dudhatra B (2017) The Indian Egg-Eating Snake, *Elachistodon westermanni* (Colubridae): comments on distribution and new localities from Gujarat, India. IRCF Reptiles & Amphibians 24: 203–206.

Vyas R, Patel VV, Thakur MN (2011) Records of the Slender Racer, *Coluber gracilis* (Günther, 1862), from Gujarat state with notes on its distribution. Sauria 33: 51–56.

Vyas R, Prajapati V (2012) Record of *Geckoella deccanensis* (Günther, 1864) (Squamata: Gekkonidae) from Dang, Gujarat state, India. Gekko 6: 2–6.

Whitaker R, Captain A (2004) Snakes of India. The field guide. Draco Books, Chennai, 481 pp.